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Final Report: 2016 Energetic Materials Gordon Research Conference and Gordon Research Seminar Research Area 7: Chemical Sciences - 7.0 Chemical Sciences (Dr. James K. Parker)

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W911NF-16-1-0112

5b. GRANT NUMBER

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611102

6. AUTHORS
Nick Glumac, Katie Brown

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

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Gordon Research Conferences, Inc.
512 Liberty Lane

West Kingston, RI 02892 -1502

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U.S. Army Research Office
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Research Triangle Park, NC 27709-2211

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The views, opinions and/or findings contained in this report are those of the author(s) and should not contrued as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT
The GRC on Energetic Materials brought together scientists from many countries working in government laboratories, research universities and private industry to discuss state-of-the-art research on explosives, pyrotechnics and propellants. The main topics of discussion were synthesis of new materials, performance, advanced diagnostics, experimental techniques, theoretical approaches, and computational models for simulating the behavior of energetic materials under a wide variety of conditions. The meeting was an important venue for presenting cutting edge fundamental research into the chemistry, physics and materials properties associated with

15. SUBJECT TERMS
Final Report

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Nick Glumac
UU	UU	UU	UU		19b. TELEPHONE NUMBER 217-244-8333

Report Title

Final Report: 2016 Energetic Materials Gordon Research Conference and Gordon Research Seminar Research Area 7: Chemical Sciences - 7.0 Chemical Sciences (Dr. James K. Parker)

ABSTRACT

The GRC on Energetic Materials brought together scientists from many countries working in government laboratories, research universities and private industry to discuss state-of-the-art research on explosives, pyrotechnics and propellants. The main topics of discussion were synthesis of new materials, performance, advanced diagnostics, experimental techniques, theoretical approaches, and computational models for simulating the behavior of energetic materials under a wide variety of conditions. The meeting was an important venue for presenting cutting edge fundamental research into the chemistry, physics and materials properties associated with ignition, combustion, detonation, ageing, thermal decomposition and mechanical damage of energetics. The program for the meeting included nine oral presentation sessions. Discussion leaders and speakers were drawn from the leading researchers in the field of energetic materials. The presentations focused on current work and new results rather than summaries of published work. Afternoons were left free for informal discussions and other unstructured activities.

The 2016 Energetic Materials GRS focused on the mechanisms behind energetic materials performance, from the chemical and molecular to large-scale effects. Graduate students and early career scientists were encouraged to present not only the "what", but also the "why" or "how".

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations:

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

Received	Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Post Doctorates

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Faculty Supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: .....

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:.....

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:.....

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):.....

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:.....

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense .....

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: .....

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

Technology Transfer

GORDON RESEARCH CONFERENCES

FINAL PROGRESS REPORT
Army Research Office
Grant Number W911NF-16-1-0112

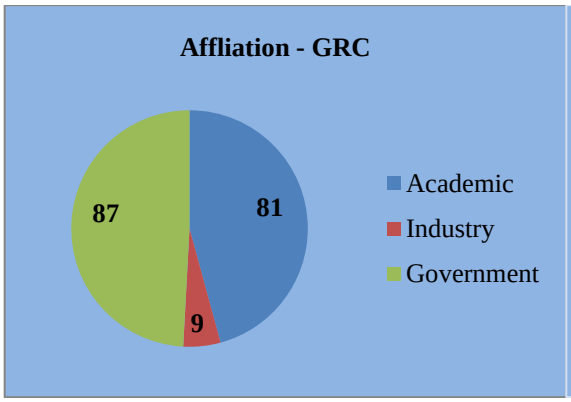
Energetic Materials GRC/GRS
June 4-10, 2016

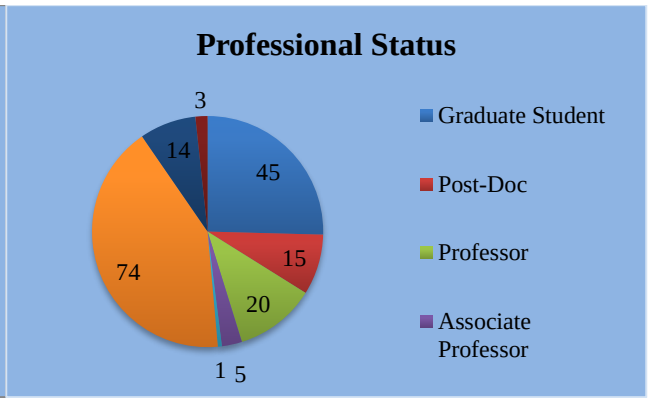
Operational Summary

The Gordon Research Conference (GRC) and Gordon Research Seminar (GRS) on Energetic Materials were held at the Stoweflake Conference Center in Stowe, Vermont from June 4-10, 2016. The meeting covered a variety of scientific topics and the content presented was highly rated by participants.

Conference Participants

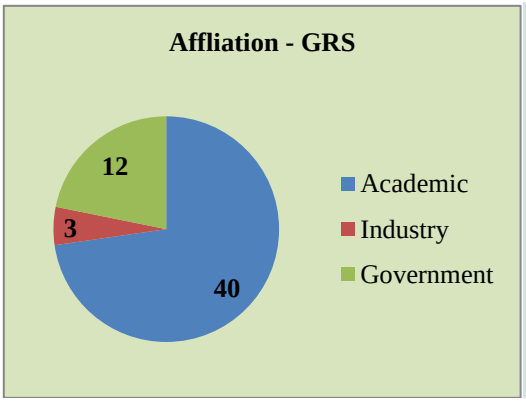
The Conference was well-attended with 177 participants. Scientists from academia represented 46% of the participants while attendees from government accounted for 49% and those from industry totaled 5%. The meeting also attracted a strong mix of young investigators and senior scientists. Students and post-docs accounted for 33% of all attendees. Approximately 19% of the participants at the 2016 meeting were women.

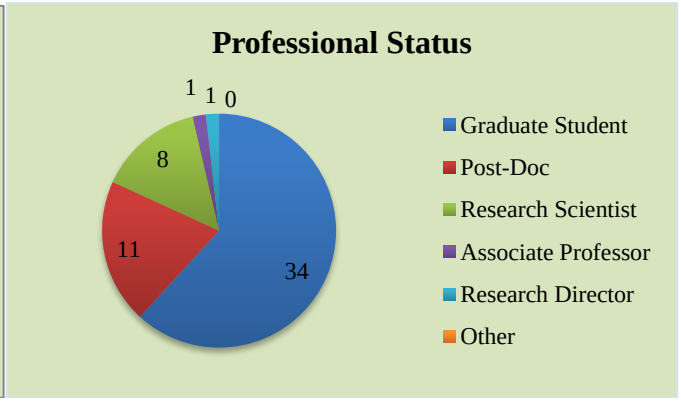




Seminar Participants

The Seminar was well-attended with 55 participants. Scientists from academia represented 73% of the participants while attendees from government accounted for 22% and those from industry totaled 5%. Students and post docs combined accounted for 82% of all attendees. Approximately 18% of the participants at the 2016 seminar were women.





Conference Program

The GRC on Energetic Materials brought together scientists from many countries working in government laboratories, research universities and private industry to discuss state-of-the-art research on explosives, pyrotechnics and propellants. The main topics of discussion were synthesis of new materials, performance, advanced diagnostics, experimental techniques, theoretical approaches, and computational models for simulating the behavior of energetic materials under a wide variety of conditions. The meeting was an important venue for presenting cutting edge fundamental research into the chemistry, physics and materials properties associated with ignition, combustion, detonation, ageing, thermal decomposition and mechanical damage of energetics. The program for the meeting included nine oral presentation sessions. Discussion leaders and speakers were drawn from the leading researchers in the field of energetic materials. The presentations focused on current work and new results rather than summaries of published work. Afternoons were left free for informal discussions and other unstructured activities.

The 2016 Energetic Materials GRS focused on the mechanisms behind energetic materials performance, from the chemical and molecular to large-scale effects. Graduate students and early career scientists were encouraged to present not only the "what", but also the "why" or "how".

Conference Budget

Funding provided by the Army Research Office supported partial or full registration for 22 graduate students, 9 professors, 1 research director and 1 research scientist at the GRC and partial or full registration for 30 graduate students, 5 postdocs, and 2 research scientists at the GRS.

Conference Feedback

Participants had an opportunity to provide feedback at the end of the Conference. The feedback collected from the meeting was extremely positive. Evaluations included numerous positive remarks regarding the selection of speakers, exposure to new ideas, discussions at the poster sessions and the collaborations among the attendees. The feedback collected from Seminar included comments about the ability to meet others in the field, high quality of posters, quality of presentations and the exchanging of information among the attendees.

GRC would like to thank the Army Research Office for its continued support of the meetings. The contributions received from the Army Research Office have been critical to the success of the conferences and are having a measurable impact in advancing the frontiers of science worldwide.

Dr. Nick Glumac, GRC Chair
University of Illinois

Dr. Katie Brown, GRS Chair
Los Alamos National Laboratory

Dr. Nancy Ryan Gray
President and Chief Executive Officer
Gordon Research Conferences

Energetic Materials
Gordon Research Conference

Expanding the Limits of Our Understanding of Energetic Materials Behavior

June 5-10, 2016

Stoweflake Conference Center
Stowe, VT

Chair: Nick Glumac
Vice Chair: Betsy M. Rice

Contributors

Final Meeting Program

Sunday	
2:00 pm - 9:00 pm	Arrival and Check-in
6:00 pm	
7:30 pm - 7:40 pm	Welcome / Introductory Comments by GRC Site Staff
7:40 pm - 9:30 pm	**The State of Energetic Materials Research** Discussion Leader: **Mario Fajardo** (U.S. Air Force Research Laboratory, Eglin Air Force Base, USA)
7:40 pm - 7:55 pm	Opening Remarks
7:55 pm - 8:10 pm	Introduction by Discussion Leader
8:10 pm - 8:40 pm	**Thomas Russell** (U.S. Army Research Laboratory, USA) "The Future: Addressing Army Needs for 2050 and Beyond"
8:40 pm - 8:50 pm	Discussion
8:50 pm - 9:20 pm	**Dana Dlott** (University of Illinois, USA) "Shock Initiation of Energetic Materials Under a Microscope"
9:20 pm - 9:30 pm	Discussion

Monday	
7:30 am - 8:30 am	Breakfast
8:30 am	Group Photo
9:00 am - 12:30 pm	**Experimental Developments: Fundamental Studies** Discussion Leader: **Shawn McGrane** (Los Alamos National Laboratory, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:45 am	**Dana Dattelbaum** (Los Alamos National Laboratory, USA) "*In Situ*, Time-Resolved Diagnostics of Shock-Driven Reactive Flow"
9:45 am - 9:55 am	Discussion
9:55 am - 10:25 am	**Jennifer Gottfried** (U.S. Army Research Laboratory, USA) "Predicting Explosive Performance from Non-Detonative Experiments"
10:25 am - 10:35 am	Discussion
10:35 am - 11:05 am	Coffee Break
11:05 am - 11:35 am	**Choong-Shik Yoo** (Washington State University, USA) "Barochemistry to High Energy Density Solids"
11:35 am - 11:45 am	Discussion
11:45 am - 12:15 pm	**Michael Armstrong** (Lawrence Livermore National Laboratory, USA) "Bridging the Gap: How Do We Reconcile Reaction Rates Observed in Long and Ultrashort Time Scale Shock Compression Experiments?"
12:15 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
3:00 pm - 4:00 pm	Power Hour *The GRC Power Hour is an optional informal gathering open to all meeting participants. It is designed to help address the challenges women face in science and support the professional growth of women in our communities by providing an open forum for discussion and mentoring.* Organizers: **Suhithi Peiris** (AFRL Munitions Directorate, Eglin Air Force Base, USA) and **Dana Dattelbaum** (Los Alamos National Laboratory, USA)
4:00 pm - 6:00 pm	Poster Session

6:00 pm	Dinner
7:30 pm - 9:30 pm	**Synthesis of Novel Energetic Materials** Discussion Leader: **Nirupam Trivedi** (U.S. Army Research Laboratory, USA)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	**Karl Christe** (University of Southern California, USA) "Synthesis of High Energy Density Materials"
8:10 pm - 8:20 pm	Discussion
8:20 pm - 8:45 pm	**Rebecca Wilson** (Naval Surface Warfare Center, Indian Head Explosive Ordnance Disposal Technology Division, USA) "Synthesis of Advanced Energetic Materials"
8:45 pm - 8:55 pm	Discussion
8:55 pm - 9:20 pm	**Michael Zdilla** (Temple University, USA) "Expedition to Breach the CHNO Ceiling by the Introduction of Varied-Oxidation-State Manganese into Energetic Materials"
9:20 pm - 9:30 pm	Discussion
Tuesday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	**Computations and Modeling of Energetic Materials** Discussion Leader: **Maija Kukla** (University of Maryland, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:45 am	**Ryan Austin** (Lawrence Livermore National Laboratory, USA) "Investigating the Crystal-Level Mechanics and Chemistry of Shock-Loaded HMX via Continuum-Based Simulation"
9:45 am - 9:55 am	Discussion
9:55 am - 10:25 am	**Santanu Chaudhuri** (University of Illinois, USA) "Dynamics at the Hot Spot Interface in Energetic Materials – New Insights and Unresolved Questions on Hot-Spot Initiation and Growth"
10:25 am - 10:35 am	Discussion
10:35 am - 11:05 am	Coffee Break
11:05 am - 11:35 am	**Alejandro Strachen** (Purdue University, USA) "Role of Non-Statistical Processes in the Shock and Laser Induced

	Decomposition of High-Energy Density Materials"
11:35 am - 11:45 am	Discussion
11:45 am - 12:15 pm	**Thomas Sewell** (University of Missouri, USA) "Fundamental Studies of HE Mechanics and Transport Based on MD Methods"
12:15 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm	Dinner
7:30 pm - 9:30 pm	**Extreme Phenomena in Energetic Materials**
	Discussion Leader: **Blaine Asay** (University of Illinois, USA)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	**Doug Tasker** (Los Alamos National Laboratory, USA) "The Intriguing Relationships of Explosives with Plasmas"
8:10 pm - 8:20 pm	Discussion
8:20 pm - 8:45 pm	**Ronald Brown** (University of Illinois, USA) "Evidence of Pre-Compression States in Convergent Detonation"
8:45 pm - 8:55 pm	Discussion
8:55 pm - 9:20 pm	**Steven Todd** (Sandia National Laboratories, USA) "Numerical/Empirical Results of Converging and Colliding Shock Waves"
9:20 pm - 9:30 pm	Discussion
Wednesday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	**Reactive Materials**
	Discussion Leader: **Steven Son** (Purdue University, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:45 am	**Ed Dreizin** (New Jersey Institute of Technology, USA) "Do We Need to Wash Boron?"
9:45 am - 9:55 am	Discussion

9:55 am - 10:25 am	**Alex Mukasyan** (Notre Dame University, USA) "Solid Flame: Is It Possible?"
10:25 am - 10:35 am	Discussion
10:35 am - 11:05 am	Coffee Break
11:05 am - 11:35 am	**Michelle Pantoya** (Texas Tech University, USA) "Manipulating Mechanical Properties of Core-Shell Aluminum Microstructures to Enhance Reactivity"
11:35 am - 11:45 am	Discussion
11:45 am - 12:15 pm	**Kyle Sullivan** (Lawrence Livermore National Laboratory, USA) "Reactive Material Phenomena at Multiple Length and Time Scales"
12:15 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm	Dinner
7:00 pm - 7:30 pm	Business Meeting *Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair*
7:30 pm - 9:30 pm	**Computations/Modeling/Theory** Discussion Leader: **DeCarlos Taylor** (U.S. Army Research Laboratory, USA)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	**Anguang Hu** (Defence Research and Development Canada, Canada) "A Fully Integrated Physical-Chemical-Mechanical Description of the Compression Process on High-Pressure Induced Transformations and Disruptive Energetics"
8:10 pm - 8:20 pm	Discussion
8:20 pm - 8:45 pm	**Igor Schweigert** (U.S. Naval Research Laboratory, USA) "Chemical Reactions that Control Initiation: A Theoretical Perspective and Applications to Nitramines"
8:45 pm - 8:55 pm	Discussion
8:55 pm - 9:20 pm	**Marc Cawkwell** (Los Alamos National Laboratory, USA)

	"Applying Extended Lagrangian Born-Oppenheimer Molecular Dynamics to Shock-Induced Chemistry"
9:20 pm - 9:30 pm	Discussion
Thursday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	**Reactive and Energetic Materials**
	Discussion Leader: **Naresh Thadani** (Georgia Institute of Technology, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:45 am	**Michael Zachariah** (University of Maryland, USA) "Relating Atomic Properties of Oxidizers to Ignition Behavior"
9:45 am - 9:55 am	Discussion
9:55 am - 10:25 am	**Virginia Manner** (Los Alamos National Laboratory, USA) "Tailoring the Sensitivity of Nitrate Ester Initiating Explosives"
10:25 am - 10:35 am	Discussion
10:35 am - 11:05 am	Coffee Break
11:05 am - 11:35 am	**Lori Groven** (South Dakota School of Mines and Technology, USA) "Smart Energetics: Harnessing Piezoelectric Behaviour"
11:35 am - 11:45 am	Discussion
11:45 am - 12:15 pm	**Timothy Weihs** (Johns Hopkins University, USA) "Controlling Inorganic Combustion Reactions with Chemistry and Geometry"
12:15 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm	Dinner
7:30 pm - 9:30 pm	**Macro-Scale Energetic Materials Testing**
	Discussion Leader: **Fan Zhang** (Defence Research and Development Canada, Canada)
7:30 pm - 7:45 pm	Introduction by Discussion Leader

7:45 pm - 8:20 pm	**David Frost** (McGill University, Canada) "Quantifying Particle Momentum Effects from Heterogeneous Explosive Systems"
8:20 pm - 8:30 pm	Discussion
8:30 pm - 9:05 pm	**Kevin McNesby** (U.S. Army Research Laboratory, USA) "Quantitative Imaging of the Explosive Near Field Using High Speed Cameras"
9:05 pm - 9:15 pm	Discussion
9:15 pm - 9:30 pm	Closing Remarks
Friday	
7:30 am - 8:30 am	Breakfast
9:00 am	Departure

Energetic Materials (GRS)
Gordon Research Seminar

Molecular to Macroscale Mechanisms in Energetic Materials Performance

June 4-5, 2016

Stoweflake Conference Center
Stowe, VT

Chairs: Katie E. Brown & Hayleigh J. Lloyd

Contributors

Final Meeting Program

Saturday	
2:00 pm - 5:00 pm	Arrival and Check-in
3:30 pm - 3:45 pm	Introductory Comments by GRC Site Staff / Welcome by the GRS Conference Chair
3:45 pm - 4:30 pm	**Nanostructured Materials** Discussion Leaders: **Christopher Molek** (Air Force Research Laboratory, USA) and **William Shaw** (University of Illinois at Urbana-Champaign, USA)
3:45 pm - 3:50 pm	Introduction by Discussion Leader
3:50 pm - 4:05 pm	**Rachel Huber** (Los Alamos National Laboratory, USA) "The Role of Atmosphere in Nanocarbon Formation Under Extreme Conditions for Detonation of Composition B"
4:05 pm - 4:10 pm	Discussion
4:10 pm - 4:25 pm	**Christopher Shuck** (University of Notre Dame, USA) "Quantitative 3D Analysis of the Ni-Al System: Nanostructure-Reactivity Relationship"
4:25 pm - 4:30 pm	Discussion
4:30 pm - 6:00 pm	Poster Session
6:00 pm	Dinner

7:30 pm - 9:30 pm	**Combustion and Ignition**
	Discussion Leaders: **Brian Barnes** (U.S. Army Research Laboratory, USA) and **Will Bassett** (University of Illinois at Urbana-Champaign, USA)
7:30 pm - 7:35 pm	Introduction by Discussion Leader
7:35 pm - 7:50 pm	**Vincent Baijot** (Laboratory for Analysis and Architecture of Systems, CNRS, France) "A Bottom-Up Micro-Kinetic Approach to the Al Combustion Modeling in an Oxidizing Atmosphere"
7:50 pm - 7:55 pm	Discussion
7:55 pm - 8:10 pm	**Kerri-Lee Chintersingh** (New Jersey Institute of Technology, USA) "Oxidation Kinetics and Combustion of Boron Particles with Functionalized Surfaces"
8:10 pm - 8:15 pm	Discussion
8:15 pm - 8:30 pm	**Jeffery DeLisio** (University of Maryland, USA) "Reaction Mechanisms of Air Sensitive Aluminum Clusters at High Heating Rates"
8:30 pm - 8:35 pm	Discussion
8:35 pm - 8:50 pm	**Michael Soo** (McGill University, Canada) "Combustion Regimes of Aluminum Particles in Dense Suspensions"
8:50 pm - 8:55 pm	Discussion
8:55 pm - 9:10 pm	**Michael Grapes** (Johns Hopkins University, USA) "Fundamentals of Ignition in Reactive Materials"
9:10 pm - 9:15 pm	Discussion
9:15 pm - 9:30 pm	General Discussion
Sunday	
7:30 am - 8:30 am	Breakfast
9:00 am - 11:00 am	**Novel and Unexpected Energetic Materials**
	Discussion Leaders: **Devon Swanson** (University of Rhode Island, USA) and **Daniel Ward** (University of Edinburgh, United Kingdom)
9:00 am - 9:05 am	Introduction by Discussion Leader
9:05 am - 9:20 am	**Jonathan Bennion** (University of Michigan, USA)

	"The Quest for a Better Boom: Cocrystallization of Energetic Materials"
9:20 am - 9:25 am	Discussion
9:25 am - 9:40 am	**Tomasz Witkowski** (Ludwig Maximilian University of Munich, Germany) "5,5'-Bis(2,4,6-Trinitrophenyl)-2,2'-Bi(1,3,4-Oxadiazole): The Novel Heat Resistant Explosive"
9:40 am - 9:45 am	Discussion
9:45 am - 10:00 am	**Matthew Schmitt** (Los Alamos National Laboratory, USA) "Shock-Driven Reactions in Nano-Sized Aluminum and Dilute Hydrogen Peroxide"
10:00 am - 10:05 am	Discussion
10:05 am - 10:20 am	**Brad Steele** (University of South Florida, USA) "Novel High-Nitrogen Energetic Materials"
10:20 am - 10:25 am	Discussion
10:25 am - 10:40 am	**Min Sheng** (The Dow Chemical Company, USA) "Reactive Chemical Hazards of Azide Compounds: A Case Study and Lessons Learned"
10:40 am - 10:45 am	Discussion
10:45 am - 11:00 am	General Discussion
11:00 am - 12:30 pm	Poster Session
12:30 pm	Lunch
1:30 pm - 2:30 pm	**Mentorship Component: Careers in Energetic Materials Research**
	Discussion Leaders: **Rachel Huber** (Los Alamos National Laboratory, USA) and **Philip Myint** (Lawrence Livermore National Laboratory, USA)
1:30 pm - 2:15 pm	**Daniel Hooks** (Los Alamos National Laboratory, USA) "Explosive Careers at U.S. National Laboratories"
2:15 pm - 2:30 pm	Discussion
2:30 pm - 3:00 pm	Evaluation Period
	Fill in GRS Evaluation Forms
3:00 pm	Seminar Concludes

Energetic Materials GRC
Registration List

Abere, Michael J	Sandia National Labs	Poster Presenter	Registered
Adams, David P	Sandia National Labs	Poster Presenter	Registered
Armstrong, Michael R	Lawrence Livermore National Laboratory	Speaker	Registered
Asay, Blaine	University of Illinois	Speaker	Registered
Aubert, Stephen A	Arm Research Lab	Attendee	Registered
Austin, Ryan	Lawrence Livermore National Laboratory	Speaker	Registered
Baijot, Vincent	CNRS	Poster Presenter	Registered
Bajis, Thomas M	Naval Surface Warfare IHEODTD	Poster Presenter	Registered
Barnes, Brian C	U.S. Army Research Laboratory	Poster Presenter	Registered
Bassett, Will P	University of Illinois at Urbana-Champaign	Poster Presenter	Registered
Batyrev, Iskander G	US Army Research Laboratory	Poster Presenter	Registered
Baxter, Amanda F	University of Southern California	Poster Presenter	Registered
Beason, Matthew T	Purdue University	Poster Presenter	Registered
Bennion, Jonathan C	University of Michigan	Poster Presenter	Registered
Blumenthal, Rik	Auburn Chemistry	Poster Presenter	Registered
Bolden-Frazier, Nydeia	AFRL - Munitions Directorate	Attendee	Registered
Bowden, Patrick R	Los Alamos National Laboratory	Poster Presenter	Registered
Brown, Katie E	Los Alamos National Laboratory	Poster Presenter	Registered
Brown, Ronald E	University of Illinois	Speaker	Registered
Bukovsky, Eric V	LLNL	Attendee	Registered
Burritt, Rosemary	Los Alamos National Laboratory	Poster Presenter	Registered
Busby, Taylor S	University of Rhode Island	Attendee	Registered
Byrd, Edward F	Army Research Laboratory	Poster Presenter	Registered
Carney, Joel R	NSWC IHEODTD	Attendee	Registered
Cawkwell, Marc	Los Alamos National Laboratory	Speaker	Registered
Cervantes, Octavio	Lawrence Livermore National Laboratory	Attendee	Registered
Chaudhuri, Santanu	University of Illinois	Speaker	Registered
Chen, Xuemin	The Dow Chemical Company	Poster Presenter	Registered
Chintersingh, Kerri-Lee	New Jersey Institute of Technology	Poster Presenter	Registered
Christe, Karl O	University of Southern California	Speaker	Registered
Coffey, Kevin R	University of Central Florida	Poster Presenter	Registered
Collins, Eric S	Army Research Laboratory	Poster Presenter	Registered
Comte, Sebastien	Herakles	Attendee	Registered
Cooper, Leora	Massachusetts Institute of Technology	Poster Presenter	Registered
Crochet, Michael	University of Dayton Research Institute	Poster Presenter	Registered
Dalton, Douglas A	Defense Threat Reduction Agency	Attendee	Registered

Dattelbaum, Dana M	Los Alamos National Laboratory	Speaker	Registered
Dean, Steven W	US Army Research Laboratory	Poster Presenter	Registered
DeLisio, Jeffery B	University of Maryland	Poster Presenter	Registered
Denekamp, Chagit	RAFAEL	Attendee	Registered
Dlott, Dana D	University of Illinois	Speaker	Registered
Doherty, Ruth M	Energetics Technology Center	Attendee	Registered
Dorgan, Robert J	AFRL	Poster Presenter	Registered
Dorgan, Catherine G	University of Dayton/Air Force Research Lab	Poster Presenter	Registered
Dossi, Eleftheria	CRANFIELD UNIVESRITY	Poster Presenter	Registered
Dreizin, Ed	New Jersey Institute of Technology	Speaker	Registered
Dube, Pascal	Nalas	Poster Presenter	Registered
Durban, Matthew	LLNL	Attendee	Registered
Emery, Samuel B	NSWC-IHEODTD	Poster Presenter	Registered
Endsor, Robert	QinetiQ	Attendee	Registered
Esteve, Alain	Laas-CNRS	Attendee	Registered
Fajardo, Mario E	U.S. Air Force Research Laboratory	Discussion Leader	Registered
Farrow, Darcie	Sandia National Laboritories	Poster Presenter	Registered
Felts, Joshua	NSWC IHEODTD	Poster Presenter	Registered
Fried, Laurence E	Lawrence Livermore National Laboratory	Poster Presenter	Registered
Frost, David L	McGill University	Speaker	Registered
Furman, David	NRCN and Hebrew University of Jerusalem	Poster Presenter	Registered
Glumac, Nick	University of Illinois	Chair	Registered
Gottfried, Jennifer L	U.S. Army Research Laboratory	Speaker	Registered
Gozin, Michael	Tel Aviv University	Poster Presenter	Registered
Grapes, Michael D	Johns Hopkins University	Poster Presenter	Registered
Groven, Lori J	South Dakota School of Mines and Technology	Speaker	Registered
Guerieri, Philip M	University of Maryland College Park	Poster Presenter	Registered
Hardin, David B	Air Force Research Laboratory	Attendee	Registered
Hastings, Daniel L	New Jersey Institute of Technology	Poster Presenter	Registered
Hong, Joseph	Washington State University	Poster Presenter	Registered
Hooks, Daniel E	Los Alamos National Laboratory	Attendee	Registered
Hu, Anguang	Defense Research and Development Canada	Speaker	Registered
Huber, Rachel	Los Alamos National Laboratory	Poster Presenter	Registered
Hunter, Steve	Army Research Laboratory/University of Edinburgh	Poster Presenter	Registered
Jacob, Rohit J	University of Maryland	Poster Presenter	Registered
Jenkins, Timothy A	US ARMY Research Laboratory	Poster Presenter	Registered
Johnson, Curtis E	NAVAIR	Poster Presenter	Registered
Johnson, Stephanie	AFRL	Poster Presenter	Registered
Julien, Philippe	McGill University	Attendee	Registered
Kay, Jeffrey J	Sandia National Laboratories	Poster Presenter	Registered

Kennedy, Stuart	The University of Edinburgh	Poster Presenter	Registered
Kinsey, Alex H	Johns Hopkins University	Poster Presenter	Registered
Knepper, Robert A	Sandia National Laboratories	Poster Presenter	Registered
Kosiba, Graham	Rensselaer Polytechnic Institute	Poster Presenter	Registered
Kukla, Maija	University of Maryland	Discussion Leader	Registered
Lacina, David	University of Dayton Research Institute-AFRL	Attendee	Registered
Lightstone, James M	NSWC-IHEODTD	Poster Presenter	Registered
Lindsay, C. Michael	Air Force Research Laboratory	Poster Presenter	Registered
Little, Brian K	AFRL/RWME/UDRI	Poster Presenter	Registered
Lloyd, Hayleigh J	University of Edinburgh	Poster Presenter	Registered
Maestas, Joseph T	Applied Research Associates, Inc.	Attendee	Registered
Maharrey, Sean P	NSWC IHEODTD	Poster Presenter	Registered
Manner, Virginia	Los Alamos National Laboratory	Speaker	Registered
Mares, Jesus O	Purdue University	Poster Presenter	Registered
Martynowych, Dmitro	Massachusetts Institute of Technology	Attendee	Registered
Mattson, William D	US Army Research Laboratory	Attendee	Registered
McGrane, Shawn	Los Alamos National Laboratory	Discussion Leader	Registered
McLennan, Lindsay R	University of Rhode Island	Poster Presenter	Registered
McNesby, Kevin L	U.S. Army Research Laboratory	Speaker	Registered
Mi, XiaoCheng	McGill University	Poster Presenter	Registered
Minier, Leanna M.G.	Sandia National Laboratories	Poster Presenter	Registered
Mohan, Salil	NSWC IHEODTD	Poster Presenter	Registered
Molek, Christopher D	Air Force Research Laboratory	Poster Presenter	Registered
Monk, Ian W	New Jersey Institute of Technology	Poster Presenter	Registered
Mukasyan, Alex	Notre Dame University	Speaker	Registered
Myint, Philip C	Lawrence Livermore National Laboratory	Poster Presenter	Registered
Neel, Christopher H	Air Force Research Laboratory, Munitions Directorate	Attendee	Registered
O'Grady, Caitlin H	Sandia National Laboratories	Poster Presenter	Registered
Oleynik, Ivan I	University of South Florida	Poster Presenter	Registered
Olles, Joseph	Sandia National Labs	Poster Presenter	Registered
OSullivan, Owen T	Temple University	Poster Presenter	Registered
Overdeep, Kyle	Johns Hopkins University	Poster Presenter	Registered
Oxley, Jimmie C	U of Rhode Island	Attendee	Registered
Padhye, Richa	Texas Tech University	Poster Presenter	Registered
Pagoria, Philip F	Lawrence Livermore National Laboratory	Attendee	Registered
Pantoya, Michelle	Texas Tech University	Speaker	Registered
Park, Samuel	Sandia National Laboratories	Poster Presenter	Registered
Pauls, Joshua	University of Notre Dame	Poster Presenter	Registered
Peiris, Suhithi M	AFRL Munitions Directorate, Eglin Air Force Base	Attendee	Registered
Pemberton, Steven J	Air Force Research Laboratory	Poster Presenter	Registered

Piekiel, Nicholas W	US Army Research Laboratory	Poster Presenter	Registered
Pontalier, Quentin	McGill University / Mechanical Engineering	Poster Presenter	Registered
Pravica, Michael G	University of Nevada, Las Vegas	Poster Presenter	Registered
Reeves, Robert V	Lawrence Livermore National Laboratory	Poster Presenter	Registered
Reinert, Alexandra A	Naval Surface Warfare Center, Indian Head	Attendee	Registered
Rettinger, Ryan C	University of Rhode Island	Attendee	Registered
Rice, Betsy M	US Army Research Laboratory	Vice Chair	Registered
Ridge, Claron J	University of Dayton Research Institute	Poster Presenter	Registered
Rojas, Stephen	Redtower Labs	Attendee	Registered
Rossi, Carole	LAAS-CNRS	Poster Presenter	Registered
Row, Sara L	South Dakota School of Mines and Technology	Poster Presenter	Registered
Russell, Thomas	U.S. Army Research Laboratory	Speaker	Registered
Ryu, Young Jay	Washington State University	Poster Presenter	Registered
Schmidt, Martin J	Air Force Research Laboratory	Poster Presenter	Registered
Schmitt, Matthew M	Los Alamos National Laboratory	Poster Presenter	Registered
Schoenitz, Mirko	New Jersey Institute of Technology	Poster Presenter	Registered
Schweigert, Igor V	U.S. Naval Research Laboratory	Speaker	Registered
Sewell, Thomas D	University of Missouri	Speaker	Registered
Shaw, William	University of Illinois at Urbana-Champaign	Poster Presenter	Registered
Sheng, Min	The Dow Chemical Company	Poster Presenter	Registered
Shoaf, Ashley L	Old Dominion University	Poster Presenter	Registered
Shuck, Christopher E	University of Notre Dame	Poster Presenter	Registered
Smirnov, Aleksandr	State Scientific Research Institute of Mechanical Engineering	Poster Presenter	Registered
Son, Steven F	Purdue University	Discussion Leader	Registered
Soo, Michael J	McGill University	Poster Presenter	Registered
Sorensen, Christian J	Los Alamos National Laboratory	Poster Presenter	Registered
Soto, Denisse	NSWCIHEODTD	Poster Presenter	Registered
Steele, Brad A	University of South Florida	Poster Presenter	Registered
Stepanov, Victor	US Army, ARDEC	Poster Presenter	Registered
Strachen, Alejandro	Purdue University	Speaker	Registered
Sullivan, Kyle T	Lawrence Livermore National Laboratory	Speaker	Registered
Swanson, Devon	University of Rhode Island	Poster Presenter	Registered
Tappan, Alexander S	Sandia National Laboratories	Poster Presenter	Registered
Tasker, Doug	Los Alamos National Laboratory	Speaker	Registered
Taylor, DeCarlos	U.S. Army Research Laboratory	Discussion Leader	Registered
Thadani, Naresh	Georgia Institute of Technology	Discussion Leader	Registered
Todd, Steven N	Sandia National Laboratories	Speaker	Registered
Trivedi, Nirupam J	U.S. Army Research Laboratory	Discussion Leader	Registered
Valancius, Cole J	Sandia National Laboratories	Poster Presenter	Registered

Vickery, James	McGill University	Poster Presenter	Registered
Vummidi Lakshman, S	Johns Hopkins University	Poster Presenter	Registered
Wainwright, Elliot	Johns Hopkins University	Poster Presenter	Registered
Wang, Jue	University of Illinois at Urbana-Champaign	Poster Presenter	Registered
Ward, Daniel	University of Edinburgh	Poster Presenter	Registered
Weihs, Timothy	Johns Hopkins University	Speaker	Registered
Welle, Eric J	Air Force Research Laboratory/Munitions Directorate	Attendee	Registered
Whittaker, Jack	Qinetiq Ltd	Attendee	Registered
Wilson, Rebecca M	Naval Surface Warfare Center	Speaker	Registered
Windler, Gary K	Los Alamos National Laboratory	Poster Presenter	Registered
Wingard, Leah	Army Research Laboratory, WMRD	Poster Presenter	Registered
Witkowski, Tomasz G.	Ludwig Maximilian University of Munich	Speaker	Registered
Wixom, Ryan R	Sandia National Laboratories	Poster Presenter	Registered
Yancey, Benjamin	Lawrence Livermore National Laboratory	Poster Presenter	Registered
Yarrington, Cole D	Sandia National Labs	Poster Presenter	Registered
Yoo, Choong-Shik	Washington State University	Speaker	Registered
Zachariah, Michael R	University of Maryland	Speaker	Registered
Zaug, Joseph M	Lawrence Livermore National Laboratory	Poster Presenter	Registered
Zdilla, Michael J	Temple University	Speaker	Registered
Zeiri, Yehuda	Ben-Gurion University	Attendee	Registered
Zhang, Fan	Defence Research and Development Canada	Discussion Leader	Registered
Zuckerman, Nathaniel	Lawrence Livermore National Laboratory	Poster Presenter	Registered

Energetic Materials GRS
Registration List

Abere, Michael J	Sandia National Labs	Poster Presenter	Registered
Baijot, Vincent	CNRS	Speaker	Registered
Bajis, Thomas M	Naval Surface Warfare IHEODTD	Poster Presenter	Registered
Barnes, Brian C	U.S. Army Research Laboratory	Discussion Leader	Registered
Bassett, Will P	University of Illinois at Urbana-Champaign	Discussion Leader	Registered
Bennion, Jonathan C	University of Michigan	Speaker	Registered
Bowden, Patrick R	Los Alamos National Laboratory	Poster Presenter	Registered
Brown, Katie E	Los Alamos National Laboratory	Chair	Registered
Burritt, Rosemary	Los Alamos National Laboratory	Poster Presenter	Registered
Chintersingh, Kerri-Lee	New Jersey Institute of Technology	Speaker	Registered
Cooper, Leora	Massachusetts Institute of Technology	Poster Presenter	Registered
Dean, Steven W	US Army Research Laboratory	Poster Presenter	Registered
DeLisio, Jeffery B	University of Maryland	Speaker	Registered
Gozin, Michael	Tel Aviv University	Poster Presenter	Registered
Grapes, Michael D	Johns Hopkins University	Speaker	Registered
Hastings, Daniel L	New Jersey Institute of Technology	Poster Presenter	Registered
Hong, Joseph	Washington State University	Poster Presenter	Registered
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Huber, Rachel	Los Alamos National Laboratory	Speaker	Registered
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Kinsey, Alex H	Johns Hopkins University	Poster Presenter	Registered
Kosiba, Graham	Rensselaer Polytechnic Institute	Poster Presenter	Registered
Lavoie, Jonathan	École Polytechnique de Montréal	Poster Presenter	Registered
Lloyd, Hayleigh J	University of Edinburgh	Chair	Registered
Maestas, Joseph T	Applied Research Associates, Inc.	Poster Presenter	Registered
Mi, XiaoCheng	McGill University	Poster Presenter	Registered
Molek, Christopher D	Air Force Research Laboratory	Discussion Leader	Registered
Myint, Philip C	Lawrence Livermore National Laboratory	Discussion Leader	Registered
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Padhye, Richa	Texas Tech University	Poster Presenter	Registered
Pauls, Joshua	University of Notre Dame	Poster Presenter	Registered
Pontalier, Quentin	McGill University / Mechanical Engineering	Poster Presenter	Registered
Reinert, Alexandra A	Naval Surface Warfare Center, Indian Head	Attendee	Registered
Rice, Betsy M	US Army Research Laboratory	Poster Presenter	Registered

Ryu, Young Jay	Washington State University	Poster Presenter	Registered
Schmitt, Matthew M	Los Alamos National Laboratory	Speaker	Registered
Shaw, William	University of Illinois at Urbana-Champaign	Discussion Leader	Registered
Sheng, Min	The Dow Chemical Company	Speaker	Registered
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Sorensen, Christian J	Los Alamos National Laboratory	Poster Presenter	Registered
St-Charles, Jean-C	École Polytechnique de Montréal	Poster Presenter	Registered
Steele, Brad A	University of South Florida	Speaker	Registered
Swanson, Devon	University of Rhode Island	Discussion Leader	Registered
Vickery, James	McGill University	Poster Presenter	Registered
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Wainwright, Elliot	Johns Hopkins University	Poster Presenter	Registered
Wang, Jue	University of Illinois at Urbana-Champaign	Poster Presenter	Registered
Ward, Daniel	University of Edinburgh	Discussion Leader	Registered
Witkowski, Tomasz G.	Ludwig Maximilian University of Munich	Speaker	Registered